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ABSTRACT

Based on two papers presented at the American Educational Research Association meeting in 1981, this report provides an overview and major outcomes of a three-year study of the Research and Development Utilization (RDU) program. The RDU program tested and assessed a comprehensive model for assisting schools to use results of educational research and development in local school improvement efforts. The first paper presents the outcomes of the RDU program at the school level, while the second presents an analysis of the way in which product characteristics, technical assistance, the internal problem-solving process, and school and pupil characteristics predict the level of success of the program. (This report is a summary of Volume 2 of the Final Report.) (Author/MLF)

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Linking R&D with Schools

Strategies for Knowledge Use and School Improvement: A Summary

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PREFACE

This document presents an overview and major outcomes from a three year study of NIE's Research and Development Utilization (RDU) program. The intent of this summary is to enable a wide audience in the educational community to share some of the important lessons, findings, and implications from that program that may be useful in designing future dissemination and school improvement activities. The language of this report is somewhat technical and statistical analyses are reported. A non-technical summary is in preparation and will be available from NIE later in 1981.

The RDU program demonstrated and assessed a comprehensive model for assisting schools to use results of educational research and development in local school improvement efforts. The RDU model is unique in combining several school improvement strategies into one program framework, permitting the combined and complementary effects of the strategies to be seen. Seven RDU demonstration projects were in operation in various parts of the United States from 1976 to 1979. The assessment study, conducted by Abt Associates Inc., ended July 1, 1981.

This summary is based on two papers presented at the American Education Research Association Meetings in 1981. The first gives an overview of the RDU program, the Abt Associates study, and program outcomes that occurred in participating schools. The second examines the contribution that different elements of the RDU model made to the program's overall success in fostering improvement in schools and in educational practice.

This document provides a summary of one volume of the Final Reports written by Abt Associates. That volume focuses on outcomes of the RDU program at the school level. A companion volume examines the interorganizational support structures that were established to help participating schools to (a) engage in a systematic problem-solving process, and (b) identify and implement high quality products of educational research and development that would be relevant and useful in their local improvement effort. These and other reports from the Abt Associates study are described in an annotated bibliography at the end of this document.

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LINKING R&D WITH LOCAL SCHOOLS: A FEDERAL PROGRAM AND ITS OUTCOMES*

The RDU Program

In June of 1976, the National Institute of Education (NIE) established the Research and Development Utilization program as a new dissemination effort to help schools clarify and solve local problems. The RDU program emphasized a research-based, rational approach to local school improvement through the use of existing, validated products of federally funded research and development activities. This program was designed to achieve three major objectives:

- to help schools alleviate specific, locally defined problems in the areas of basic skills and career education;
- to help school and community personnel learn about the products of educational research and development; and
- to increase understanding of how the local program improvement process can be better managed and become more effective.

The RDU program was unusual among federally funded dissemination strategies because it was equally concerned with the dissemination and use of R&D products and with the development of local organizational capabilities to solve problems. Other federal programs have tended to concentrate on either product dissemination or local capacity building.

The RDU Process

The core of the RDU approach was to provide each participating site with assistance in problem solving, broken into stages represented by the sequence of activities listed below:

- identification of a problem or set of problems;
- examination of alternative solutions to the problem, focusing particularly on the products of educational R&D;
- selection of a specific solution considered to be appropriate to alleviate the problem;
- implementation of the solution; and
- evaluation and incorporation of both the solution and the problem-solving process.

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*This section is based on a paper presented by James A. Molitor, at the 1981 meetings of the American Educational Research Association.

The service delivery system of the RDU program operated through seven regionally dispersed projects, each of which coordinated a network of organizations and individuals involved in the provision of services and information to local school districts. As a whole, the seven projects operated in 20 states and served over 300 schools or school districts over a three-year period (1976-1979).

The Northwest Reading Consortium (NRC), under the overall direction of the Washington State Education Agency, operated as a consortium of four states in the Northwest: Washington, Oregon, Alaska and Idaho. The project built upon the existing Right to Read programs in the four states. (The Right to Read program is a nationwide program sponsored by the U.S. Office of Education to eliminate functional illiteracy.) The Northwest Regional Educational Laboratory was also an affiliate, providing training to project staff and support in the development of a pool of R&D products.

The Georgia State Department of Education operated a project which provided funds and services to all participating school districts located in three Cooperative Educational Service Areas. The emphasis of the RDU project in Georgia was on building local school district capacities in the early stages of planning and program selection. The implementation phase of the problem-solving model was subsequently carried out with federal funds available through the state department of education under Title IV-C of the Elementary and Secondary Education Act and with other state funds.

The Pennsylvania Department of Education developed and coordinated a school improvement process which involved the participation and resources of several organizations: Research for Better Schools (a regional education lab); Research and Information Services for Education (a statewide information and dissemination service); the Learning Research and Development Center at the University of Pittsburgh; and the state's Intermediate Units. The project's agencies were involved in helping sites with numerous defined steps, including a series of formal training sessions in problem solving at the school sites.

The National Education Association (NEA) operated its project in collaboration with the state education agencies and corresponding state education associations in 12 states: Alabama, California, Iowa, Massachusetts, Michigan, Minnesota, Ohio, Pennsylvania, Tennessee, Washington, Wisconsin, and Wyoming. In contrast to the other RDU projects, this project focused exclusively on the improvement of teacher inservice education. Services were provided by two field agents in each state who trained local staff.

The Florida Department of Education served as prime contractor in a linkage system which also involved the state universities (especially Florida State University and the University of Florida), and eight of the state's Teacher Education Centers (TECs). An important feature of this project was that training in group problem-solving techniques was provided not only to the field agents (one of whom was located in each TEC), but also to selected local school staff. The school site facilitators, with the help of the field agents, were responsible for leading the staff at their sites through the entire problem-solving process.

The Career Education Dissemination Project of the Michigan Department of Education was designed to help local sites meet the requirements of state career education legislation passed in 1974. One of the project's major objectives was to develop a permanent dissemination and diffusion system in career education. Because of this emphasis on permanence, the project attempted to work with existing structures and personnel in the state's intermediate school districts rather than build new ones. The primary strategy was to provide direct training and programmatic funds to coordinators who were staff members at local sites.

The NETWORK Inc., a non-profit research and service organization in Andover, Massachusetts, coordinated a consortium of agencies in six states: in Minnesota, the agency involved was a teacher center associated with a university; in Washington, a local school district; in California, a regional education laboratory sponsored by NIE; in Kansas, an independent statewide education diffusion organization; in Connecticut, a cooperative service agency supported by local school districts; and in Massachusetts, a division of the NETWORK itself. This project was formed mainly to improve the utilization of R&D products in reading in selected local schools. The field agents provided assistance to the local sites, while a considerable amount of technical assistance and support was provided to the field agents by the project office in Andover.

Some common features ran throughout the seven projects and in the structure of support services provided to local schools:

- the operation of a project headquarters to coordinate the services supplied to schools;
- the development and administration of a knowledge base composed of educational research and development products;
- the development of training and technical assistance components to serve the project's field agents and/or school staff; and
- the development of project evaluation and research activities to facilitate local self-evaluation by the school sites.

RDU as a Dissemination Strategy

To gain an understanding of how the RDU program operated, we first review the local school context within which it was working. In general, schools have been accustomed to one of two approaches to problem solving. One is a top-down approach in which focal problems and solution strategies have been identified by building, and/or district-level administrators, sometimes with the aid of consultants or other external resource persons called in from universities, labs and centers, etc. Although practitioner inputs may have been considered, decision making was largely centralized.

That is, whether at the local building/district level, or from some larger change program, administrators identified courses of action or programs to be implemented by local school staff. Although such decisions may have been informed by the latest valid research results, this research knowledge was not balanced against--nor always cognizant of--the wealth of craft knowledge resident in local teaching staffs. Thus, this top-down decision making may not have been problem solving in the sense of a rational, participatory set of activities as espoused by the RDU program; rather it was simply resource allocation by administrators faced with such questions as where to buy the needed new textbooks.

A second common approach to problem solving may have been even more prevalent. This approach was characterized by the absence of organized problem solving or change activities. Teachers were simply left on their own, "free" to identify and cope with problems as they saw them, perhaps negotiating with building or district administrators for needed resources on an individual basis.

These approaches to the dissemination and utilization of new educational knowledge were significantly altered under the RDU program. The new view of dissemination which RDU embodied incorporated a staff development process in which local personnel were to receive training in problem-solving processes, enhancing their ability to play central roles in more broadly participatory "bottom-up" decision making.* Working with one or more external resource persons who could link local staff to a large "knowledge base" (in the form of a compendium of educational products and materials), local staff would learn how to identify and prioritize their problems and goals. They would then be assisted in a review and "screening" of potential solutions--the products and materials in the knowledge base which, when implemented, could alleviate the problems they chose to focus on. This assistance would include training in matching various characteristics of the products with the characteristics of the local problems and with available staff or other local resources. The goal of these activities was the careful selection of a product or program which "fit" local circumstances. Staff would then receive any necessary training (e.g., through inservice) for the implementation and continued use of the adopted program.

Implicit in this view of dissemination are longer range goals than simply identifying and coping with an immediate local problem. The training and involvement in participatory problem solving and the increased awareness of products were aimed at increasing individual teachers' inclinations to implement and continue using adopted programs. But beyond this, the RDU program more generally was designed to enhance local capacity for identifying and solving future problems as well. This is reflected in the fact that implementation and incorporation of a product was only one RDU thrust; the other intent was the incorporation of the problem-solving process itself.

Thus, as a dissemination and knowledge utilization strategy, the RDU program involved mobilizing internal and external resources in enhancing

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*Note, however, that the "bottom-up" activities were structured--sometimes very rigidly--by the project the school participated in, and the problems addressed in this program were restricted to basic skills and career education.

school effectiveness. The "treatments" or "interventions" this program entailed included:

- a large and accessible base of educational products which embody the knowledge to be utilized;
- a problem-solving process, including rational decision making by a broadly representative local action team (or LAT);
- process assistance from an array of external human resources, including field agents, who connected local action teams with the R&D product base and other resources; and
- limited financial support to some schools, usually in the form of small stipends to cover release time, travel to demonstration or training sites, etc.

The Study of the RDU Program

In November 1977, Abt Associates Inc., a social science research firm based in Cambridge, Massachusetts, was contracted to conduct a study of the RDU program. The study addressed six major issues:

- how relationships are managed between various agencies which have the expertise and resources to help local schools solve problems;
- to what degree an intervention program such as RDU can help schools overcome barriers to successful problem solving (such as limited access to information or lack of planning skills, etc.);
- to what degree the products of educational R&D are relevant to the problems and contexts of local schools;
- what the impact of the products of educational R&D is once they have been adopted and implemented;
- what factors contribute to the institutionalization of the RDU approach within a variety of organizations; and
- how field agents coordinate the flow of external resources to schools, and whether this helps the schools solve problems.

As our earlier discussion of this program suggested, the R&D Utilization program was highly ambitious in its aims. Not only was it intended to increase teachers' awareness and utilization of R&D products in local schools (product outcomes), it was also intended to have a more global consequence: to improve the way schools identified and went about solving their problems, both in terms of increasing the breadth of participation in the problem-solving process, and by making the problem-solving activities themselves more rational (process outcomes).

Early in our study of the RDU program, we conducted a series of relatively brief familiarization visits to local schools participating in each of the seven operational projects. Our aim on these visits was to talk with staff of these schools so as to become more familiar with how the program operated at the local level. Through unstructured interviews we learned that, in general, awareness and utilization of new educational products were, in fact, being increased through the use of improved problem-solving practices. However, it quickly became apparent that other things were happening at these schools as direct results of their participation in the program: the schools themselves were changing in a variety of ways (organizational outcomes), and so were the school personnel (personal outcomes). This led us to expand the range of outcomes to be studied under our research design so as to include an array of unintended organizational and personal impacts at least as important as the intended R&D product and problem-solving process impacts.

Data were collected in face-to-face focused but unstructured interviews at 51 sites during 1978 to 1980. Case studies were written on 46 sites, five of which also received site visits. We also conducted mailed surveys of principals and a sample of teachers at participating schools during the fall of 1979. This paper presents an overview of the four types of program outcomes we observed in our data.

Outcomes for R&D products. A major objective of the R&D Utilization program was to install an appropriate R&D product in schools participating in the program. Thus, the degree to which schools identified, adopted, and implemented a product relevant to the problem they sought to alleviate is a critical measure of the intermediate or proximal success of the program. Other intermediate product outcomes include various aspects of teacher satisfaction with the products, the numbers of pupils and the percentage of their school days affected by implementation, and how difficult the product was to implement, including the need for adaptation.

Approximately 100 different products or sets of curricular materials were adopted by the participating schools. The most popular products, in terms of frequency of adoption, were such reading packages as the Wisconsin Design for Reading, Exemplary Center for Reading Instruction (ECRI), Houghton-Mifflin Basal Management System, and San Diego Right-to-Read. Career education packages which were most frequently adopted included Career Development Centered Curriculum, It Works, and AEL Career Decision Making Program. Popular mathematics programs included Brevard County LAMP and STAMM. In general, products ranged from lists of objectives for teachers to detailed management programs; some included a variety of materials for classroom use, such as slides or filmstrips and tape cassettes, student work and record-keeping sheets, and associated texts.

The characteristics of the products themselves varied along a number of dimensions in addition to whether they were R&D- or practitioner-developed. For example, some were intended for use in only one classroom, whereas others were implemented throughout the schools. Some, such as San Diego Right to Read, consist of sets of ideas from which adopting teachers may pick and choose, while others, such as ECRI, require significant, highly structured changes of all teachers and are therefore more difficult to implement.

Of particular interest here is the fact that the products and materials adopted were more frequently practitioner developed--i.e., NDN products--than R&D-based materials such as those in the NIE catalog. This may be due to a conspicuous dearth of R&D products in some areas, such as career education. In this case, interest only burgeoned in the early 1970s, so the time available for producing a variety of relevant, validated products in time for the RDU program (which began in 1976) was too short.

Other areas in which validated R&D products were scarce include school- or district-wide planning, inservice training, and basic skills at the secondary level. In this latter case, the need for products--especially reading at the secondary level--was not recognized until after the RDU program was underway.

Finally, some schools needed assistance with topics stemming from racial and ethnic integration and the special needs of minority groups. The available pool of products for bilingual students was relatively sparse.

Practitioner-developed products also had a logistical advantage in that frequently there were experienced trainers, funded through such other federal programs as NDN, who could provide pre-implementation assistance and follow-up service to adopting schools. As we will see in later analyses, availability of training in product use was strongly related to several measures of program success.

Within the schools that had reached the "product selection" stage by the time of our final data collection, over 80% of the teachers responding to our survey indicated they were using the product or had used it in the past. Another 5% had definite plans to use it in the future. Fewer than 20% of the users reported the products needed adaptation to a great or very great extent, and their use was at a high level: over 65% of those using the products reported they used them with all of their students, and 85% of the users stated the product was regularly used at least once per week. Satisfaction with the adopted products was generally high, with over half of the users reporting that to a great or very great extent, the products were directly relevant to the most pressing problem in their school, met a need in the classroom, and provided new ideas and not just ideas they were already using. Another 25%-30% of the users reported these statements were at least true "to some extent."

The users did not encounter serious problems with implementing the products they adopted. About 20% reported the products required major changes from their previous teaching style, changes in classroom organization or management, or substantial additional record keeping. Only about 9% reported difficulties in implementing the program or materials to a great or very great extent. However, we will see in later analyses that perceived difficulty in implementing adopted materials was positively related to school-level outcomes, possibly because the greater investment of effort enhanced feelings of program ownership.

A more long-term, or distal, product outcome is the extent to which it is incorporated into the everyday functioning of the classroom--i.e.,

the extent to which product utilization is "routinized." At this point data from two sources become relevant: in order for the product to be incorporated or routinized, not only must the teachers indicate they plan to continue using the program or materials in the future--albeit with modifications--but building administrators must indicate that certain steps necessary to ensure the continued possibility of use have been taken. Thus, although 83% of the users reported they would continue to use the products, we must still consider such long-term questions as whether the product has been incorporated into curriculum plans, measures taken to ensure that new staff would use the product, etc.

Building principals of schools which had adopted products were asked whether a variety of such events had already occurred or would definitely occur in the future. In over 70% of the schools, the products had been or would be incorporated into curriculum plans. About 50% reported that written guidelines for product use had already been developed, and another 11% reported this would definitely occur. Almost 60% reported that new staff would receive training or orientation in the use of the products, and that training or inservice for current staff would be used to ensure continued product utilization. Over 90% reported that some or all of their teachers would use the products to some extent, 62% indicating the products would be used quite extensively.

Outcomes for the problem solving process. In addition to the emphasis on getting an R&D product installed at participating sites, a major focus of the R&D Utilization program was to increase a school's capacity to deal with its problems by providing staff with training and practice in group problem-solving processes. Though not explicit in any RDU project, it is implicit that there are two critical aspects to this goal of improving problem solving at the site level: one involves the use of a rational problem-solving model, while the other stresses the need for relatively broad-based participation in problem-solving activities. That is, any and all groups which will be affected by the decisions reached should be represented on the problem-solving team. Thus, the extent to which the sites actually used a rational problem-solving model, and the extent to which there was broad participation in problem-solving activities become two important intermediate outcomes of participation in the RDU program. Note that both could vary for each site across stages of the local process.

As the program operated at the site level, these two goals were generally met as the site went through the problem-solving process: in most cases, a field agent was available to guide the site's activities, and in some cases economic sanctions could be applied should the site not "toe the mark." But factors inherent in the process militate against its later replication (such as the fact that the process is complex and time consuming, which some staff resented very much). Our conversations with site staff also revealed that even where they felt they could go through the process again without the aid of the field agent, the release time provided by the RDU program was often a sine qua non of its success: otherwise teachers could not spend the (often substantial) amounts of time the problem-solving model

required.* We must also remember that in general, improving their problem-solving practices was not the reason sites got involved in this program.

This implies that a more distal process outcome was the extent to which the improved problem-solving practices--or at least some of them--were likely to be used again in dealing with other problems.

In terms of breadth of participation in the problem-solving process, our data suggest that there was generally good representation of groups which would ultimately be affected by the decisions made. This was true across all stages of the process, although shortcomings other than broad representation were evident. In the case of 90 sites on which we had highly detailed data, we rated them on their problem-solving and group decision-making activities in terms of a listing we developed of desired traits specific to each phase of the process. Where a site's rating was reduced, we indicated specific types of deviations from these traits. These fell into interesting patterns across the various stages.

At 92% of the sites, problem-solving teams were established, and there was generally good representation on these teams of the groups which would be affected by the teams' decisions. However, during the early stages of problem solving (problem identification and solution selection), we found that decisions were often made or heavily influenced by administrators or other external parties. This was true during problem identification at 36% of the sites, and during solution selection at 24% of the sites. In the later stages of problem solving (planning for implementation and implementation), the continuity of formal decision-making groups was not always upheld; this was true at almost 20% of the sites. Meetings became less regular at 26% of the sites, and during planning for implementation, decision-making at 21% of the sites did not involve all affected groups.

In terms of the rationality of the process, we found that although many sites appear to have adhered closely to the principles of sound problem solving, well over 40% of the sites showed at least one--sometimes several--departures from our ideal criteria. During problem identification activities, the most frequent variant was that the problem definition was merely a restatement of someone's a priori assumptions or pet theory (46% of the cases). Alternative definitions were not posed and considered (43%), and the problem was not adequately specified prior to beginning the search for solutions (34%).

During solution selection, the most common deviations were that alternative solutions were not carefully examined according to a set of explicit criteria (44%), and evidence of solutions' effectiveness or suitability was not obtained (32%). During planning for implementation, 44% of the sites did not make formal plans for some or most aspects of implementation.

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*Key characteristics of this model are (1) thorough analysis and prioritization of school needs or problems before searching for school improvement strategies; (2) a search outside the local school system for assistance and information, particularly in the search for solutions to problems; (3) systematic examination of alternative solutions according to explicit criteria; and (4) a focus on solutions which have been field tested and empirically validated.

During the implementation stage, adherence to sound practice was generally much closer, with only about a quarter of the sites showing any deviations. Most common among these deviations were not taking adequate measures to ensure implementation of essential features and goals of the products (23%), and adaptations of the products implemented (23%)* which might not have been necessary.

The most distal process outcome measure is the extent to which the sites repeated or intend to repeat some or all of the problem-solving process to solve other school problems. Our data showed that 41% of the principals and about 34% of the teachers at participating schools said they had repeated (or were repeating) all or part of the RDU approach to address another issue in their school. The most often repeated part of the approach included use of teams of teachers and administrators to make decisions. Schools were less likely to report that they would use the services of field agents or other external consultants.

Outcomes for participating schools as organizations. We have seen that the R&D Utilization program's objective of getting products installed at participating sites was, in large measure, achieved, although many were not R&D products. To a somewhat lesser extent, the program's goal of improving local problem solving was also achieved, at least for this one time. However, neither of these categories of outcomes necessarily implies that there will be any enduring changes in the schools as organizations. That is, the simple fact that a certain set of activities was accomplished, culminating in the adoption and implementation of, for example, a new reading program, need not mean that the school's curriculum was improved, or that the new materials were in any way better than those used previously. Similarly, the organizational structure of the school, which is difficult to change under any circumstances, can survive other changes without alteration. After all, organizational changes were not the intended outcomes of the RDU program.

However, as we quickly learned during our preliminary site visits, a number of unanticipated effects were occurring on the schools themselves and on their staff members. The spontaneous reports of such effects by teachers and principals in unstructured interviews led us to develop specific lines of inquiry into these organizational and personal effects. Asking teachers to serve as internal observers of what was taking place in their schools, we found that 50%-70% of the teachers said that the following factors were somewhat or much better at their schools: improved curriculum, better materials available, greater collegiality among staff, and generally better teaching. About 40% of the teachers reported school organization and management, decision-making and problem-solving procedures, and morale were somewhat or much better. About 45% of the teachers said the image of their school in the community had been somewhat or much improved.

To be sure, 30%-50% of the teachers reported "no change" on any one of these dimensions, but only a tiny minority (generally fewer than 2% of the respondants,) said these dimensions had been affected adversely. Com-

*Later analyses showed that local adaptation of the products was negatively related to program outcome measures.

parable data from principals of participating schools and from our research teams' visits to the schools confirmed these reports.*

Outcomes for Participating Staff. As a result of their participation in the RDU program, the staff of the schools involved had a variety of experiences: some received training in group problem-solving techniques; some had the opportunity to visit other schools or educational product developers to observe R&D products in use. Others received training in the use of an adopted product and returned to their schools to train their colleagues; still others became spokespersons who visited other schools to tell of their own experience with using a new educational product.

An anonymous questionnaire was used to ask participating teachers about the extent to which they personally benefitted from involvement in the RDU program in a variety of ways. In general, 15%-30% of the teachers reported they had benefitted in the following ways to a great or very great extent: their teaching skills had improved; leadership skills had improved; they had learned about curriculum development; had more self-confidence and new resources for helping their colleagues. Another 30%-40% reported these benefits "to some extent." Increased self-confidence and job satisfaction were also reported by 45%-50% of the teachers, and nearly 30% reported they had been given increased responsibility or been promoted to some extent or to a great or very great extent.

A Model For Examining Impacts of the R&D Utilization Program

As we saw in the preceding overview of selected program impacts, the available outcome data are extensive--too extensive, in fact, to permit us to analyze all of our variables. To reduce the number of outcomes to a more manageable set for analysis, we developed a number of summary additive scales. In this section of the report, we identify the outcome measures and present data showing how these scales are related to each other.

The outcome measures developed include the following:

Process outcomes

- Site satisfaction with the problem-solving process, based on reported satisfaction with the services or activities of the local action team, the field agent, developers of adopted materials, and the amount of time required to complete the process;

- Site satisfaction with the activities of the field agent, including the field agent's assistance with various aspects of the problem solving process such as diagnosing the problem, developing criteria for selecting a solution, screening potential solutions, locating additional technical resources, etc.;

*The Pearson correlation between principal reports and our field teams' report of organizational impacts was .44 ($p<.01$), and between our field team and teacher reports was .55 ($p<.01$).

- Incorporation of the problem solving process, such as reuse of all or part of the activities and procedures which the process involved;

Product Outcomes

- Extent to which principal and teachers report the problem has been solved through use of the adopted materials, including improvements in pupils performance, attitudes, and behavior; and

- Incorporation of the adopted product and/or materials, a measure of the extent to which use continues after implementation.

Organizational Outcomes

- Impacts on the school as an organization, a global measure of impact on the school including improvements (as a result of participation in the RDU program) in curriculum, materials, school organization, staff morale, etc.

Outcomes for Participating Staff

- Personal impacts on participating staff, including improved teaching, enhanced leadership skills, promotions or increased responsibility, etc.

We expected that these measures would be interrelated in ways which would suggest a model for examining program impacts at the site level. For example we predicted that more distal outcomes such as incorporation of the adopted materials and the process* would be a result of more proximal or intermediate outcomes such as satisfaction with the process, satisfaction with the field agent, and so forth.

To investigate this matter, we performed a series of stepwise regressions, using each distal outcome as a dependent measure with the others as predictors. These regressions are summarized in Table 1, which presents standardized regression coefficients for those variables entering as predictors and increasing the R^2 (proportion of explained variance) by at least 1%, along with an indication of their order of entry. The selection process was stopped when no further variables met this criterion. A raw correlation matrix is presented in Table 2.

To graphically summarize how these outcome measures seem to be tied together, we present Figure 1, which is a schema of their interrelationships suggested by the regression results. In this figure, note that the outcome measures to the left of the diagram are those assumed to be more immediate or proximal, while those to the right are assumed to be more distal outcomes. We will first discuss the model in brief, then return to examine the implications for the distal outcomes.

*Other distal outcomes include "extent to which the problem is solved," personal impacts, and organizational impacts.

Table 1

STANDARDIZED STEPWISE REGRESSION COEFFICIENTS
FOR DISTAL OUTCOMES ON OTHER OUTCOMES
(N = 179 schools)

Other Outcomes	Distal Outcomes				
	Problem Solved	Incorporation of R&D Product	Personal Impacts	Organization Impacts	Process Incorporation
Satisfaction with Problem-Solving Process		.14* (3)[a]		.16** .(4)	.01 (3)
Satisfaction with Field Agent			.15* (3)		
Scope of Implementation	.19* (4)	.32** (2)		.22** (2)	
Problem Solved		.26** (1)	.29** (2)	.27** (1)	
Incorporation of Products	.25** (2)				.12 (3)
Personal Impacts	.22** (3)			.19** (3)	
Organization Impacts	.32** (1)		.33** (1)		.25** (1)
Process Incorporation				.16* (5)	
Multiple R^2:	.48	.35	.32	.51	.16
Adjusted R^2	.47	.33	.30	.50	.13

[a] Number in parentheses indicates order of entry in stepwise regressions.

* $p \leq .05$

** $p \leq .01$

Table 2

PEARSONIAN CORRELATIONS AMONG OUTCOME MEASURES

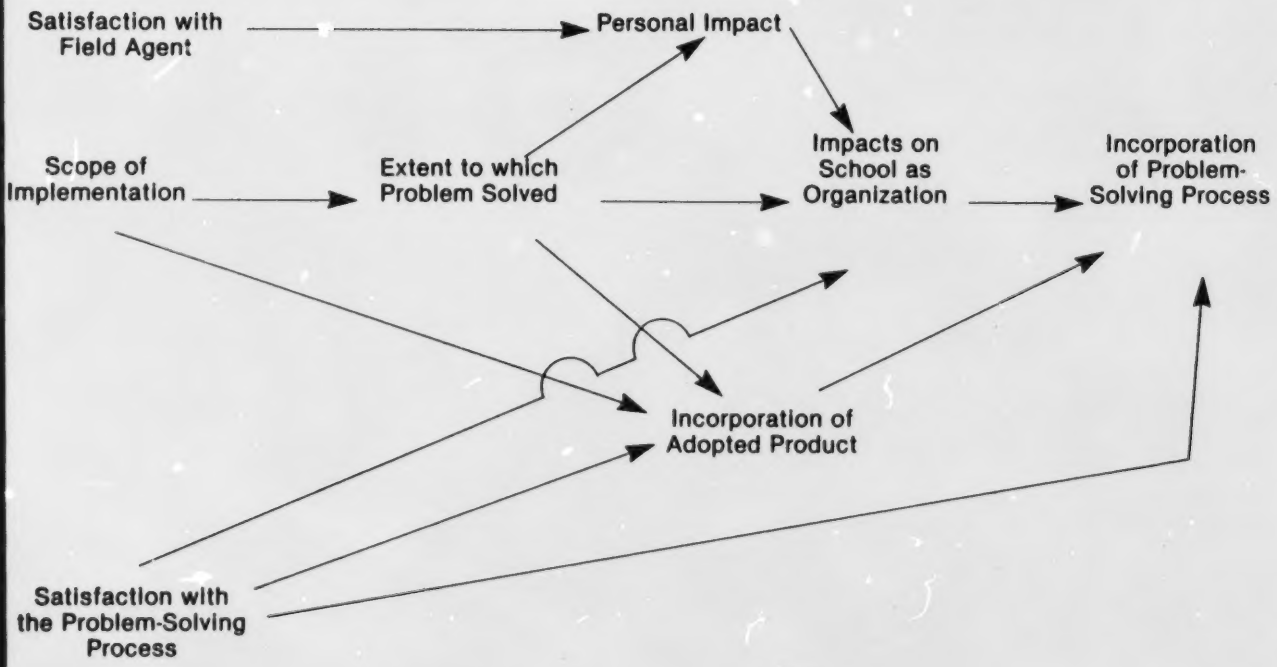
(N = 180 schools)

Outcome Measures	Satisfaction with Problem Solving	Satisfaction with Field Agent	Scope of Implementation	Problem Solved	Incorporation of R&D Product	Personal Impacts	Organization Impacts	Process Incorporation
Satisfaction with Problem-Solving Process	-	.42**	.30**	.35**	.34**	.30**	.43**	.27**
Satisfaction with Field Agent		-	.16*	.18*	.12	.27**	.26**	.11
Scope of Implementation			-	.49**	.50**	.29**	.48**	.27**
Problem Solved				-	.50**	.48**	.60**	.26**
Incorporation of R&D Products					-	.24**	.46**	.28**
Personal Impacts						-	.49**	.21**
Organization Impacts							-	.39**
								-

* $p \leq .05$

** $p \leq .01$

FIGURE 4-1
Schema of Outcome Measure Interrelationships


Satisfaction with Field Agent
Personal Impact
Scope of Implementation
Extent to which Problem Solved
Impacts on School as Organization
Incorporation of Problem-Solving Process
Incorporation of Adopted Product
Satisfaction with the Problem-Solving Process

The most immediate outcomes in this model are those which are assumed to occur closely on the heels of selection and implementation of the adopted R&D product. These include two process outcomes: satisfaction with the activities of the field agent, and satisfaction with the problem-solving process, along with one product outcome: scope of implementation of the R&D product (which refers to the proportion of pupils in the school who are exposed to the adopted product and the proportion of their school day affected by its use).

An intermediate outcome, and one which our analyses suggest is strongly related to the distal results, is another product outcome, the extent to which site staff report the product has solved the problem. Not surprisingly, this outcome is strongly related to the scope of product implementation, and is a strong predictor of a third product outcome, the extent to which the adopted product is incorporated. Product incorporation, a primary aim of the RDU program, is also related to the scope of product implementation, and also to reported satisfaction with the problem-solving process.

Problem solution was also strongly related to two outcomes we have identified as "spinoffs," since they were not really the intended consequences of the RDU program. The first of these is a staff outcome measure, reported impacts on participants in the problem-solving process. This global measure includes reported improvements in areas such as teaching skills, leadership skills, or morale, resulting from having gone through the RDU process. The extent of personal impacts was also strongly related to reported satisfaction with the activities of the field agent, with whom the staff worked during the program.

The second spinoff effect of the RDU program was also strongly related to the extent to which the problem was solved. This organizational outcome was the global measure of impact on the participating school, and includes measures of improved curriculum and materials, decision-making structure, staff morale, and the school's image in the community. Since the organizational impact measure includes staff morale, it is not surprising that it is also related to personal impacts on participating staff.

A second primary aim of the RDU program, along with incorporation of the adopted R&D product, is incorporation of the improved problem solving process into school and district decision-making activities. That is, the RDU program intended that the rational, participatory decision-making model it espoused would be utilized again by the sites to address other problems in the future. Based on our visits to over 50 participant sites, we consider this the most distal program impact. It is most strongly related to the global measure of organizational impact, and to incorporation of the adopted R&D product (the other primary aim of the program). Predictably, incorporation of the process is also related to satisfaction with the process.

But incorporation of the process proved to be difficult at the site level, and for this reason we suggest it is the last outcome of the RDU program to be achieved. Our site visits strongly indicated that the problem with process incorporation lies in the nature of the process itself: it was complicated, time consuming to the point of frustration for many sites, only poorly understood even by many of its participants, and not a major site goal. Even at sites where there were clear indications the process (or part of it, or something like it) was being used again, members

of the local decision-making team expressed confusion over what they were really doing: "Why are we repeatedly prioritizing needs?" "Why are we spending so much time on this survey of the community?" "Why can't you just show us some products and we'll pick the one we like best?" "I just can't look at another reading program; they're all alike, anyway!" Finally, even in many sites where staff reported they understood what they were doing they were candid in admitting they could not do it again without the help of the field agent (or some other external human resource). Since incorporation of the process was a critical thrust of the RDU program, its elusiveness is a major problem to which we shall return in a later section when we investigate the efficacy of various aspects of the RDU "treatment" in producing impacts on sites.

The implications of our model for incorporation of the adopted program, on the other hand, are more clear. Incorporation is more likely if the product solves the problem, is widely implemented, and selected via a process which does not alienate participating staff. More specifically, a decision making process which ensures a close match between the characteristics of the product and the problem it is to address, followed by widespread implementation of that product, increases the likelihood of later product incorporation.

In the case of personal impacts on participating staff, it is not surprising that implementation of a product which seems to alleviate the problem would enhance teachers' feelings of classroom efficacy. Similarly, interaction with a competent field agent during the complex problem-solving process is likely to increase awareness of R&D resources, bring out leadership skills, increase interaction with colleagues, and enhance morale as a result. In Louis, et al., (1981) we examine factors related to satisfaction with the field agent, and we will see the importance of product characteristics--R&D products being a critical part of the RDU "intervention"--for site outcomes.

Finally, we may briefly consider our model's implications for organizational impacts. These appear to be enhanced by the effectiveness of the product in alleviating the problem, the scope of the product's implementation, and the magnitude of the personal impacts on participating staff just discussed. Our analyses suggest that organizational impacts are also strongly affected by the characteristics of the adopted product and by other aspects of the RDU intervention.

The Range of Site-Level Impacts of the RDU Program

In conceptualizing how best to measure program impacts at the site level, two basic options were identified by our project staff. One is a straightforward empirical approach which involves the development of a variety of scales from batteries of items in the surveys of principals and teachers and from the coding of case study and site visit data. A second, more typological approach was suggested by our increasing familiarity with the sites' experience, gained through site visits and through the coding of site visit and case study data. This second approach makes use of more global assessments of the kinds of outcomes we saw, and is appealing because it reduces the number of different dimensions of program success considered in some of our discussions.

To develop a typological outcome measure, we focused on four measures of program impact: incorporation of R&D products; incorporation of the problem-solving process; impacts on the school as an organization; and personal impacts on the staff at participating schools. (The computation of these and other measures of the RDU program's effects is discussed in the technical appendix to the final report.) Note that these include measures of the two primary intended impacts of the RDU program--incorporation of R&D products and the problem-solving process--and the two areas of spinoff effects we observed--organizational and personal impacts. We feel that the following typology captures the range of global outcomes found at the sites included in our analyses, and provides a concise summary of the RDU program's success. Sites were assigned to categories on the basis of whether they were "high," "moderate-to-low," or "low" on the four impact measures cited above. The resulting categories are:

- Large-scale RDU success characterizes sites which generally followed the RDU model for problem solving with a great deal of fidelity, implemented an R&D product from their project's knowledge base, and showed unmistakable signs of incorporation of both the product and the problem-solving process, along with such spinoff effects as personal impacts on participating staff and impacts on the school as an organization; (34% of the sample)

- Mixed success sites were those which had two high ratings, one being a program goal (either product or process incorporation) and the other a spinoff outcome; (17% of the sample)

- RDU success characterized those schools which had one or two high scores on program goals; (16% of the sample)

- Spinoffs were those sites which had some positive effects on the school as an organization and/or personal impacts on participating staff, but which did not adhere closely to the problem-solving or product adoption goals of the program to any great extent. Note that in many cases, schools in this category had their own agendas to begin with--e.g., developing curriculum guidelines--and used the resources of the RDU program to achieve them; (10% of the sample)

- Moderate to low Success characterized those schools which had moderate to low ratings on 3 or 4 outcome areas, and no high ratings at all; (10% of the sample)

- Failure characterized those schools which were very poor achievers on two or more outcome dimensions, and which had no high ratings; (13% of the sample).

The validity of this categorization is supported by consistency with other findings, both related to other outcome measures and to what was known from the study of the seven operational contractors. For example, examining how other outcome measures were distributed among these categories, we found that sites classified as large-scale RDU successes also showed the

highest averages on measures of the scope of R&D product implementation, reported that the problem they were addressing through their RDU participation was solved to the greatest extent, and reported the highest levels of impacts on pupils. These sites also showed the highest mean level of satisfaction with the problem-solving process, and were the most satisfied with the activities of the field agent. In addition, they had the highest percentages of staff reporting that RDU was quite different from previous problem-solving practices.

Sites classed as very low successes, as discussed above, show very low problem solved scores and indicate the lowest levels of satisfaction with the problem-solving process and the field agent. Staff at these schools also indicated that the RDU program was not very different from previous problem-solving activities.

Summary and Conclusions

We have seen in this chapter that the RDU program appears to have had a variety of positive impacts, not only in its intended areas related to the use and incorporation of new curricular products and materials and to the use of an improved problem-solving process, but also in two areas we identified as spinoffs. These later impacts included positive effects on participating staff and on their schools as well. We have also seen that the various outcomes we identified may be interrelated in ways which provide a model for examining program impacts.

What we have not yet seen is evidence that the various elements of the RDU "treatment"--the products, the problem-solving process, and the use of external human resources--are directly related to the magnitude of these effects. This identifies the next phase of our analyses, presented in the following section.

PRODUCT, PROCESS AND PEOPLE IN THE R&D UTILIZATION PROGRAM
THE POWER OF THE INTERVENTIONS*

Introduction

The objectives of this paper are to examine the effect of the strategies utilized in the R&D Utilization (RDU) program on school improvement outcomes, and to further examine the relative power of the RDU "intervention" as compared to the "non-manipulable characteristics" of the schools involved.

The RDU Strategy: Where It Fits Into a Larger Policy Picture

There are several basic federal/state roles that support local school improvement efforts:

- Legislative/administrative mandate: This strategy involves developing laws and regulations governing minimum standards for staffing, programs, or even student achievement. When accompanied by effective sanctions, it has been viewed by some as the most efficient--although not necessarily most effective--means for producing massive local change.

- Resource support: The resource strategy provides positive incentives or assistance to districts that wish to engage in school improvement activities. Within the resource strategy there are three distinct types of support:

  --fiscal strategies, which may take the form of "seed money" (temporary funding for improvement activities) or more permanent formula funding such as Title I;

  --technological strategies, which support materials and program development, and make information about new practices available; and

  --process/people strategies, which support free or very inexpensive technical assistance, training, consultation or other human resources.

The major federal strategy in supporting school improvement has been a combination of direct fiscal support through formula funding of various types, combined with legislation and regulations which require many, if not most, districts to make changes in their curriculum, staffing, use of time, space and facilities, and other areas of school functioning if they are to receive federal funds. The RDU strategy looked quite different from this: it emphasized voluntary involvement, offered small amounts of seed money

*This section is based on a paper presented by Karen Seashore Louis and Sheila Rosenblum at the 1981 meetings of the American Educational Research Association.

funding, and put a major emphasis on providing both technological and process/human support that would be responsive to locally defined needs.

Stimulating Voluntary Change in Schools: Arguments Against the Effectiveness of Small Scale External Intervention

Although the RDU Program involved a rather heavy level of effort on the part of local school personnel, it was in large measure an external intervention. There is an accumulating literature, however, that suggests that local school improvement activities should be "home grown" and probably locally initiated:

- Schools tend to make such major adaptations in externally developed materials that the need for external development may be questioned (Berman and McLaughlin, 1977; Charters and Pellegrin, 1973; Stearns et al., 1977).

- Externally provided technical assistance is typically not positively related to school improvement outcomes (Berman and McLaughlin, 1977). Even where it is, it is much less important than the roles played by internal change agents (Miles et al., 1978).

- The organizational characteristics of schools as a class mitigate against effective, externally provided school improvement (Derr, 1976; Weick, 1976) although not necessarily against more localized improvement.

- The organizational characteristics of schools overwhelm the characteristics of the external intervention: local structure, culture and staffing/pupil characteristics are the major determinant of innovative behavior (Rosenblum and Louis, 1981; Hage and Aiken, 1970).

- Whether or not innovations are adopted, implemented and maintained is not a rational, predictable process, but is conditioned by critical events, changes in the process, "politics" and other features (March and Olsen, 1976.)

Some of these arguments are based on the primary potency of local characteristics; others are more related to the lack of potency of external intervention. In the present paper, we first examine the degree to which the RDU interventions were potent as school improvement strategies. Second we will examine the importance of local effects; and finally, we will draw some conclusions about effectiveness of both the intervention and local characteristics on the outcomes of the program. Data for these analyses are derived from a subset of up to 90 schools which participated in the program. In addition to survey data from teachers and principals, data sources included either a "mini-ethnography" or four-five day site visits by Abt Associates staff.*

*For an extensive description of the methodology for the study, see "Policy Researcher as Sleuth," Louis, 1981.

Program Effects: The Power of the Intervention

The RDU intervention contained several strategies: small amounts of direct funds to local school sites; technological support through the introduction of externally developed programs, practices and materials; external human assistance to schools engaging in a problem-solving process; and stimulation of required internal problem-solving activities. The effect of each will be discussed in turn.

Money. Financial resources directly available from RDU to local sites were very limited: $1000-$8000 per site. Project (federally) contributed costs were but a fraction of the actual costs of the innovative process. Cost data were obtained from 22 sites, through intensive examination of records, plus interviews with major participants.

1) Variables measured: two types of costs were identified:

- Direct costs: Specific RDU activities paid for directly with RDU grant funds, e.g., purchase of the R&D product; compensation of substitutes to release teachers for RDU activities, etc.

- In-kind costs: Specific RDU activities not charged to an RDU grant. In-kind costs are incurred when district funds and other non-RDU sources provide resources to the RDU effort, or when personnel time is contributed to RDU without being directly compensated for by RDU program funds.

2) Findings and discussion: In RDU, program funds accounted, on average, for only 20% of the local site costs of participating in the program. Thus, typically, each dollar of federal money leveraged about four more from the school and school district, or from other sources.

The total costs of the project (direct plus in-kind) and the percentage of costs that were in-kind were both correlated with five basic outcomes measures for the RDU program (see Table 1). The results indicate that the total costs of the activities at the site level are not significantly correlated with any outcome measure (although the trend indicates that the higher the expenditures, in total, the less likely that the project caused significant positive outcomes).

The percentage of in-kind costs was a more powerful positive predictor of success. The data in Table 1 suggest that a school's commitment of in-kind resources reflect or motivates a desire on the part of participants to achieve successful outcomes. Increasing proportions of in-kind costs were positively associated with greater organizational change, greater incorporation of the R&D product, and more pronounced personal impacts on teachers.

Technological support: the impact of R&D products. Each project consolidated a "knowledge base" of externally developed programs, practices, or products (with an emphasis on those which had been field tested or validated) and which were made available, as appropriate, to local sites as solutions to their identified problem or need.

Table 1

Rank Order Correlations Between Costs and Outcomes

	Total $	% Inkind $
Organizational Impacts (N=22)	.04 NS	.49 p=.02
Incorporation of problem-solving process (N=21)	-.09 NS	.24 NS
Incorporation of R&D product (N=22)	.20 NS	.41 p=.06
Problem solved (N=21)	-.31 NS	.20 NS
Personal impacts (N=21)	-.26 NS	.39 p=.08

1) Variables measured:

- perceived quality of the product;
- perceived difficulty of implementation;
- local materials development;
- adaptation of R&D product before implementation;
- adaptation of R&D product after implementation;
- whether the product was field tested or validated;
- the relative advantage of the product compared to prior practice;
- the match between the defined problem and the product;
- the complexity of the product;
- the reversability of the product; and
- product included adequate guidance for implementation.

2) Findings and discussion: Table 2 reveals that product characteristics are very powerful predictors of school-level outcomes--with the exception of process incorporation. The percentage of variance explained by three or four product variables ranges from 46% in the case of reports that the problem was solved to 10% in the case of process incorporation. The several variables that enter more than one equation show interesting patterns. Product quality, which reflects the degree to which teachers and principals rate the products as relevant, applicable to their situation, and providing a genuinely new way of doing things, is particularly important in predicting the degree to which the problem was solved, the level of program incorporation, and the staff development benefits reported by the teachers. The complexity of the product is important in predicting overall organizational impacts, program incorporation, and staff development outcomes. Difficulty of implementation is a major factor in the degree to which the problem was solved, and the overall organizational impacts.

Product characteristics are, overall, significantly more important than most current implementation theories allow. Good products not only help to create organizational effects--student impacts, and organizational change--but also have significant staff development spinoffs. Local materials development and adaptation, rather than facilitating implementation and institutionalization, show weak but consistently negative relationships with outcomes. We believe, based on our site visit data that externally developed products can be implemented with only slight tinkering if the school has carefully defined what it is it needs, and has gone through a systematic process to find a product that will fit not only the problem but the local context. It is not necessary to reinvent the wheel in each district in order to obtain high levels of school improvement.

Process support: the impact of external human assistance. Two kinds of external human assistance were provided to schools through most of the RDU projects: the services of a "field agent," facilitator, or other generalist who was employed by the project to support the school in its activities over the entire problem-solving period; and also specialized, episodic

Table 2

Standardized Stepwise Regression (Beta)[+] Coefficients
For the Relationship Between Product Characteristics and Six
Measures of School Outcomes
(N = 60)

Product Characteristic Variables	Organizational Impacts	Product Incorporation	Process Incorporation	Problem Solved	Scope of Implementation	Personal Impacts
Product Quality		.24**		.58**	.19	.36**
Difficulty of Implementation	.28**			.23*	.31**	
New Materials Development	-.17				-.27*	
Pre-Implementation Adaptation						-.16
Post-Implementation Adaptation				-.19		-.13
Product Validated			.35**		.22	
Relative Advantage		.20*	.20			
Match to Problem		.19		.13		
Product Complexity	.31**	.29**				.21*
Product Reversability						
Adeq. Implem. Guidance				.17		
Multiple R^2	.34	.46	.17	.51	.33	.36
Adjusted R^2	.28	.40	.10	.46	.26	.30

+ Beta Coefficients are presented only for those variables which contributed to the reported multiple R^2. The selection process was stopped when additional variables failed to increase the Multiple R^2 by 1% or more; the order of entry was unforced.

* $p \leq .05$

** $p \leq .01$

training which was typically intended to assist the school in implementing its chosen externally developed product, or in supplementing it with materials as necessary.

1) Variables Measured:

- Field agent variables: field agent initiative and activity, field agent time on site, field agent takes a political perspective on the change process, field agent has an innovative personality structure, field agent takes a structural perspective on the change process, field agent contact with the principal.

- Other consultant variables: amount of training, diversity of training (or number of sources from which training was provided).

2) Findings and discussion: Table 3 indicates that the external human assistance provided to schools can have major impacts upon the degree to which knowledge is used and new programs implemented. Technical assistance and training activities have particularly potent impacts on overall organizational change, and program incorporation, where 36% and 40% of the variance is explained, respectively. Only process incorporation and personal impacts are poorly explained by the level of human assistance. (Note that it was also poorly explained by the characteristics of the product--issues related to process incorporation will be discussed in more detail later.)

Three variables stand out as being most important, and of these, one is related to field agent behaviors, and two are related to training. The amount of training received by the site staff prior to implementation and after implementation has a strong positive effect, and this impact is augmented by having training provided by a variety of different types of people.*

The time that the field agent spends with local site committees or "problem-solving teams" is predictive of several dependent measures. Our site visits revealed that much of the importance of the agents can be attributed to the role that they played on site in both stimulating committee members to stay active and to reach decision points, and also in providing logistical support to ensure that the meetings were scheduled regularly, that suggestions for consultants were obtained, etc. Thus, the actual presence of the agent on-site was important.

There is a tendency, revealed both by the quantitative and qualitative data, for the two types of external human assistance to have somewhat different impacts on the site. Generalists and field agents have their greatest impacts in stimulating the school to define their problems more broadly, and to think more ambitiously about what they might do to solve

*Other analyses indicate that training provided by the developer is the most important in producing positive school outcomes, but training from other consultants, and district specialists who have become involved either to augment the developer or to provide specialized resources are also important.

Table 3

Standardized Stepwise Regression (Beta)[+] Coefficients
For the Relationship of External Assistance and Six
Measures of School Outcomes
(N = 76)

External Assistance Variables	Organizational Impacts	Product Incorporation	Process Incorporation	Problem Solved	Scope of Implementation	Personal Impacts
Linking Agent (L.A.) Initiative and Activity					.24*	
L.A. Time on Site	.19	.23**			.31**	-.18
L.A. Political Perspective					-.13	
L.A. Structural Perspective						
L.A. Innovative Personality						
L.A. Contact with Principals	.16*			.13		
Amount of Training	.33**	.10	.17	.24*	.28**	.26**
Diversity of Training Sources	.25*	.43**	.22*	.31**	.19	.21*
Multiple R^2	.40	.43	.14	.21	.46	.19
Adjusted Multiple R^2	.36	.40	.10	.17	.41	.14

+ Beta Coefficients are presented only for those variables which contributed to the reported multiple R^2. The selection process was stopped when additional variables failed to increase the Multiple R^2 by 1% or more the order of entry was unforced.

* $p \leq .05$

** $p \leq .01$

them, thus producing a change program of greater scope. The specialized training from consultants, on the other hand, has more impact upon the degree to which there are actual school improvement impacts within a school: whether the problem is solved, and whether there are broader organizational changes.

The impact of internal problem-solving activities. The RDU approach required the participation of local school personnel in a variety of problem-solving activities. All of the RDU projects attempted to provide structures and criteria for this process although they had less direct influence over the internal process than they did on the external products that were made available or on the external human assistance intervention. The process was, however, an important feature of the RDU approach and the following features of the process were examined to determine their impact on school outcomes.

1) Variables Measured:

level of effort, quality of the problem-solving process, faculty influence on the process, as well as committee or team influence, central office influence, principal influence, principal level of involvement, breadth of involvement in solution selection and breadth of involvement in implementation.

2) Findings and Discussion: The internal problem-solving process accounts for less variance in our quantitative measures of school improvement outcomes than either the products or the external technical assistance (Table 4). This corresponds also to our analysis of case data, which suggests that many sites arrived at "successful" school improvement outcomes via a wide variety of locally designed routes. In some schools centralized decision making by the superintendent or principals was highly effective; in others, a decentralized, staff development approach worked well. Nevertheless, our statistical analysis does indicate a modest level of predictive power for internal process variables, particularly for the overall organizational change outcome, and somewhat for process incorporation, which was not well explained by product characteristics or external human assistance.

Most of the predictive power of the internal process on school outcomes is attributable to the breadth of involvement in solution selection, and implementation, and overall faculty influence over the decision-making process. It should be remembered that breadth of involvement in implementation reflects not just the involvement of the faculty and the principal within the implementating school, but also involvement on the part of the superintendent, central office specialists, and other relevant actors. A high score on this variable typically represented a district in which the central office staff took at least some interest in monitoring the implementation process, in providing support, and in spreading the new practice to other schools in the district, but did not dominate the process.

The involvement of the whole faculty in the problem solving process was, we observed on site visits, often a key element in spreading a "sense of ownership" from a small team or committee that designed and selected the innovation. Some teams were designed to increase faculty involvement, either by representing all grade levels or departments, and using representatives to "spread the word," or by holding special faculty meetings to discuss and

Table 4

Standardized Stepwise Regression (Beta)[+] Coefficients
For the Relationship Between the Internal Problem Solving Process
and Six Measures of School Outcomes

Internal Process Variables	Organizational Impacts (n=90)	Product Incorporation (n=90)	Process Incorporation (n=76)	Problem Solved (n=76)	Scope of Implementation (n=90)	Personal Impacts (n=76)
Level of Effort					.23*	
Quality of Problem-Solving Process	.11*					
Faculty Influence on Process	.11*			.20**		.12*
Principal Influence on Process		.13				
Superintendent Influence on Process				-.20	-.15	
Other Central Staff Influence on Process			-.13*			
Breadth of Involvement in Solution Selection	.24**		.24**		.31**	
Breadth of Involvement in Implementation	.23*	.29**	.20			
Multiple R^2	.38	.15	.20	.15	.16	.05
Adjusted Multiple R^2	.34	.12	.15	.11	.12	.02

+ Beta Coefficients are presented only for those variables which contributed to the reported multiple R^2. The selection process was stopped when additional variables failed to increase the Multiple R^2 by 1% or more; the order of entry was unforced.

* $p \leq .05$

** $p \leq .01$

vote on key decisions. Where faculty as a whole (or all of those that could reasonably be affected by the planned school improvement activities) were regularly involved, the transition between the small group that provided the legwork, and the other potential users was inevitably smoother.

One of the surprises of this analysis is the fact that principal influence was not a powerful explanatory factor. Our site-visit data indicate that, in many of the most successful schools, principals facilitated the process of problem definition, solution selection and implementation, but preferred to let the process be teacher dominated. Thus, while not totally passive, they did not tend to receive the highest scores for influence. This strategy, of course, worked only when there were active faculty who were able to take on leadership roles in promoting the process.

A final surprise is that the internal problem-solving process does not predict the level of staff development benefits reported at a school. Based upon both theory and at least some of our site visits we would have predicted that staff development benefits would have been more strongly associated with process variables such as level of effort and faculty influence. However, staff development outcomes, at least as they are aggregated to the school level, are largely a function of the amount of training received by staff members. (Other analyses presented elsewhere suggest that staff members who are on the team do derive substantially greater staff development benefits than those who are not on the team, indicating that, for individuals who are most involved, the process may make a difference.)

The Combined Intervention: Products, Process and People

The previous sections examined the impact of each aspect of the intervention separately. Overall, the product characteristics and external human assistance each separately explained greater percentages of variance in school outcomes than did the internal problem-solving activities. Not surprisingly, incorporation of the problem-solving process was the only outcome that was affected more by the internal problem-solving activities than either of the two external interventions, although the adjusted multiple R2 was not very great (.15).

However, the impact of the RDU intervention cannot be understood by only examining the three intervention strategies separately. In reality the intervention combined the three strategies, and it is therefore important to examine the potency of the combined approach. In order to do so, multiple regressions of outcomes on a set of independent variables drawn from each of the three intervention strategies were conducted. The following variables (each of which was a powerful predictor within its own group) were chosen:

- product variables: product quality, product complexity product validated, and difficulty of implementation;
- external human assistance variables: field agent/ principal contact, amount of training received, diversity of training, and field agent time on site;
- internal problem solving process variables: faculty involvement in the process, breadth of participation

in solution selection, breadth of participation in implementation and the quality of the problem-solving process.

Table 5 indicates that the real potency of the intervention is a function of the combination of strategies, resulting in high or very high percentages of variance explained on each of the school outcomes. For example, adjusted multiple R^2s were well over 50% for organizational impacts and for product incorporation. Even process incorporation, the most "elusive" of the school outcomes in our analyses had 24% of the variance explained by a combination of six variables drawn from all of the intervention categories.

The most important predictor variables of the combined intervention strategies are product quality (which enters into the equation for each outcome), product characteristics such as complexity and prior validation, amount of training received, faculty participation in the process, and breadth of participation in solution selection and implementation.

Product characteristics and diversity of training appear to be particularly important to product incorporation. But ironically product quality and prior validation are negatively related to process incorporation. The only variable that is significantly positively associated with both program outcomes is diversity of training sources. This suggests that it may be extremely difficult to have both objectives in the same program. Both site visit and survey data suggest that the program was more successful at achieving product incorporation and spinoff effects (organizational changes and staff development effects) than process incorporation. (Note this is not the same as a high quality problem-solving process, which many sites did very well as participants in this program.)

It is particularly interesting that, for each outcome, the variables that contributed to the explanation of the outcome were drawn from each of the three intervention strategies. Furthermore, with the exception of one outcome, a combination of intervention strategies is a more powerful predictor of the outcome than any of the individual intervention categories (see Table 6). The one exception is the outcome of "problem solved" which is predicted better by product variables (R^2=.46) than by a combination of strategies (R^2=.41).

The Impact of Local Site Characteristics

Local site characteristics can be strong determinants and/or impediments to a program's outcomes. In order to determine the impact of the largely non-manipulable site conditions on the RDU school outcomes, and to compare those results with the impact of the intervention, several analyses were conducted.

Variables were measured in five categories:

- principal characteristics: how long in the school; teaching experience, administrative experience, and degree to which staff rate him/her as an instructional leader;

Table 5

Standardized Stepwise Regression (Beta)[+] Coefficients
For the Relationship Between Combined Intervention Strategies and
Six Measures of School Outcomes
(N=75)

Intervention Strategies	Organizational Impacts	Product Incorporation	Process Incorporation	Problem Solved	Scope of Implementation	Personal Impacts
(Product)						
Product Quality	.18*	.12	-.20*	.58**	.22*	.36**
Product Complexity	.29**	.15*				.28**
Product Validated		.18*	-.27**		.20*	
Difficulty of Implementation						
(External Assistance)						
Linker/Principal Contact	.17**			.13		.13
Amount of Training	.22**		.18*		.21*	.22**
Diversity of Training Sources		.30**	.23*			
Linker Time on Site		.14			.37**	-.30**
(Internal Problem-Solving Activities)						
Faculty Involvement	.09		.09	.16**		
Breadth of Involvement in Solution Selection			.20*		.16	.08
Breadth of Inv. in Implementation	.16	.21**				- 17
Quality of Process	.11*					
Multiple R^2	.59	.56	.30	.43	47	.42
Adjusted Multiple R^2	.55	.52	.24	.41	.43	.36

+ Beta Coefficients are presented only for those variables which contributed to the reported multiple R^2. The selection process was stopped when additional variables failed to increase the Multiple R^2 by 1% or more the order of entry was unforced.

Table 6

Percentage of Variance in Outcomes Explained by Three Strategies of the Intervention and the Combined Intervention Strategies *

(N = 75)

Predictor Variables	Organizational Impacts	Product Incorporation	Process Incorporation	Problem Solved	Scope of Implementation	Personal Impacts
Product Characteristics	.28	.40	.10	.46	.26	.30
External Assistance	.36	.40	.10	.17	.41	.14
Internal Problem Solving Activities	.34	.12	.15	.11	.12	.02
Combined Intervention Strategies	.55	.52	.24	.41	.43	.36

*Adjusted multiple R^2.

- teacher characteristics: percent male; percent teaching for ten or more years in the school; average number of professional memberships; percent with an advanced degree;

- school size, structure and climate: size of district, size of school, influence of principals, teachers and superintendent over key educational decisions; school level (elementary or secondary), staff orientation to change, collegiality, tension among staff, previous experience with similar problem solving activities;

- characteristics of the community setting: index of disadvantagement among students, % students from white collar families, level of community change, rurality;

- nature of the problem: magnitude of problem, focus on classroom organization, focus on curriculum, or materials, focus on pupil performance, focus on role relations, focus on school organizational problems, focus on problems in staffing or staff characteristics, focus on pupil attitudes and behaviors.

Findings and discussion. The results of regressions of outcomes on each of these categories separately had little explanatory power. For both principal characteristics and characteristics of the community setting, there were no regressions that explained as much as 15% of the variance in any dependent variable. For teacher characteristics, only percentage of staff who are male contributed significantly to the explanation of overall organizational impacts. It is interesting to note that this relationship was a negative one, suggesting that male teachers (who were also more typically in secondary schools) may be particularly "independent" and resistant to an external intervention and the kinds of collaborative efforts that were a feature of the RDU program. Three structure and climate variables did explain 15% of the variance in overall organizational impact: teacher change orientation, principal influence over decision making, and teacher influence over decision making. The only category of site variables that explained three outcomes (organizational impacts, the degree to which the problem was reported to be solved, and personal and staff development impacts) was characteristics of the problem that the sites dealt with in the program. The most important variables were a focus on classroom organization and pupil performance.

However, one further step was taken, which was to examine the combined impact of the most potent site variables (based on simple correlations as well as the regression analyses) on the school impacts. For this analysis the following variables were chosen: teacher orientation to change and teacher influence over decision making; the index of disadvantagement of students; school level; percent male staff; the degree to which the problem-solving activities had begun prior to the RDU program (an index of "readiness"); and the identification of the problem as being one of classroom organization or pupil performance. As Table 7 shows, these variables do explain a relatively high percentage of variance on many of the outcomes, particularly product incorporation (R^2=.45) and organizational impacts (R^2 = .40). Personal impacts are explained least well by site characteristics. Once again a highly potent variable (identification of the problem as

Table 7

Standardized Stepwise Regression (Beta)[+] Coefficients
For the Relationship Between School Characteristics and
Six Measures of School Outcomes
(N=43)

School Characteristics	Organizational Impacts	Product Incorporation	Process Incorporation	Problem Solved	Scope of Implementation	Personal Impacts
School Level						.23
Index of Disadvantagement						.20
Teacher Influence in Decision Making		.39**	.34**			
Teacher Change Orientation	.52**			.28*		
% Male Teachers	-.28*					
Prior Problem-Solving Activities	.21	.21*	.29*	.16	.23	
Problem in Pupil Performance	.30*	.47**	-.31*	.47**	.40**	
Problem in Classroom Organization				.27*	.39**	
Multiple R^2	.42	.50	.31	.40	.40	.24
Adjusted Multiple R^2	.40	.45	.24	.34	.34	.16

+ Beta Coefficients are presented only for those variables which contributed to the reported multiple R^2. The selection process was stopped when additional variables failed to increase the Multiple R^2 by 1% or more; the order of entry was unforced.

* $p \leq .05$

** $p \leq .01$

one of pupil performance) was negatively related to process incorporation. Other variables that were predictive of both product incorporation and process incorporation are the degree of teacher influence in decision making, and the indicator of readiness.

The Relative Impact of the Intervention and Local Site Characteristics

A major objective of this paper has been to examine the relative potency of the intervention as compared to the site characteristics on the school improvement outcomes. While site characteristics proved to be powerful predictors of school outcomes, Table 8 indicates that for all but one outcome measure, the power of the intervention outweighs local site characteristics in explaining the outcomes.

We interpret this as implying that the RDU intervention was particularly effective in addressing the inequalities in innovativeness among schools that naturally occur as a result of differences in personnel resources, community resources, prior innovative experiences, etc. (In fact, there was no significant difference in outcomes based on school size, level, rurality or community turbulence, whereas the index of disadvantagement was positively correlated with outcomes.) The biggest difference is in the adjusted R^2 for personal staff development outcomes (R^2 = .36 vs. R^2 = .16), followed by an effect on organizational changes (.55 vs. .40). In other words, the spinoff effects of the program were most markedly affected by the intervention.

Only process incorporation was equally affected by both the intervention and the site characteristics, and in each case only 24% of the variance was explained by each category. How can one explain the relatively low impact of the intervention on process incorporation? While most of the RDU projects had stated objectives of permanent improvement in the general problem-solving capabilities of the school, case study and site visit data reveal that in fact the primary emphasis of the intervention was to provide assistance for engaging in a specific, targeted problem-solving process that focused on adopting and installing a new product or practice to solve a particular problem. While some training in the generic group process or problem-solving skills was included, for most sites it seemed hard to concentrate on the capacity building function at the same time as effort was being expended to solve a particular problem. Furthermore, the field agent or facilitator was viewed as crucial to the process, and without special project support, was not likely to be available to the local site again.

A final analysis was conducted to determine whether site characteristics add to the power of the intervention in explaining school outcomes. Stepwise regressions of outcome measures on variables representing a combination of each aspect of the intervention (products, external human assistance, and internal problem-solving activities) and potent site characteristics were conducted. As Table 9 demonstrates, for all outcomes, explanatory power is increased when variables from all of the above domains are considered. Eight variables explain 68% of the variance in organizational change, and once again process incorporation is the most elusive, with 29% of the variance explained. It is particularly interesting to note that for four of the six outcomes, the variables contributing to the adjusted multiple R^2 are drawn from all the domains of the intervention (products, external

Table 8

Percentage of Variance in Outcomes Explained by Combined Intervention Strategies and School Characteristics*

(N = 43)

Predictor Variables	Organizational Impacts	Product Incorporation	Process Incorporation	Problem Solved	Scope of Implementation	Personal Impacts
Combined Intervention Strategies	.55	.52	.24	.41	.43	.36
School Characteristics	.40	.45	.24	.34	.34	.16

*Adjusted multiple R^2.

Table 9

Standardized Stepwise Regression (Beta)+ Coefficients
For the Relationship Between Combined Intervention Strategies and School Characteristics and
Six Measures of School Outcomes
(N=49)

Predictor Variables	Organizational Impacts	Product Incorporation	Process Incorporation	Problem Solved	Scope of Implementation	Personal Impacts
(Product)						
Product Quality		.18**		-.43**	.14	.26**
Difficulty of Implementation					.20	
Product Complexity	.25			-.17		.20
Product Validated	.14					
(External Assistance)						
Linker/Principal Contact	.16**					
Linker Time on Site		.16*			.43**	-.33**
Amount of Training						
(Internal Problem-Solving Activities)						
Faculty Involvement	.11*			.11		.09
Breadth of Involvement in Solution Selection			.20		.16	
Breadth of Involvement in Implementation	.21**	.37**	.25*	.21		
(School Characteristics)						
Teacher Change Orientation	.31**	.31**		.23		
Principal Influence	.27**		.19			
Prob. in Pupil Perf.		.27**	-.26*	.37**		
Prob. in Classroom Org.	.18*				.22*	.30**
Index of Disadvantagement						.20*
Multiple R^2	.73	.67	.35	.59	.60	.47
Adjusted Multiple R^2	.68	.63	.29	.53	.53	.40

+ Beta Coefficients are presented only for those variables which contributed to the reported multiple R^2. The selection process was stopped when additional variables failed to increase the Multiple R^2 by 1% or more the order of entry was unforced.

* $p \leq .05$

** $p \leq .01$

assistance, and internal process) as well as site characteristics. The exceptions are the degree to which the problem was perceived as solved, in which no variable representing external human assistance had entered at the point in which the selection was stopped, and process incorporation where the explanatory variables only represent the internal problem solving activities and site characteristics. In this analysis, no variables representing the external product characteristics or external human assistance contributed to the explanation of process incorporation. This analysis reinforces the interpretation that the intervention may not have been successfully fostering the incorporation of improved problem solving. Instead, the degree to which the outcome was achieved was largely a function of the internal processes (which were less influenced by the project than the external features of the intervention), and the less manipulable site characteristics themselves.

* * * * * * * * * * *

Conclusion

The previous two papers have related part of the complex story of how schools participating in the RDU program were affected by its relatively unusual assistance strategies. A more detailed discussion of the policy implications of this study are presented elsewhere (Louis and Rosenblum, 1981) but a final distillation of what has been learned would emphasize the following points:

- Dissemination programs create two types of outcomes at the school level: knowledge utilization/implementation and school improvement/capacity building;
- Engaging in a broad knowledge utilization activity is one of the most effective means of building capacity;
- Good products produce good school outcomes: quality control is a critical element of an effective dissemination strategy;
- External technical assistance is important to facilitate both knowledge utilization and school improvement. On the whole, training provided by experts and program developers that related directly to knowledge utilization objectives was more important than generalist field agent support in producing both knowledge utilization and capacity building improvements;
- Field agents (generalists) were important in facilitating improvements in problem-solving behaviors at the school level, and increasing the level of effort and scope of knowledge utilization. However, a high level of involvement by such agents may diminish capacity-building outcomes;
- The quality of the problem-solving process is less important in producing knowledge utilization outcomes than has often been thought. However, it is a key to other school improvement outcomes;

- School characteristics such as the staff's orientation to change and the amount of principal influence are important determinants of how well schools will implement a problem-solving process, but they do not overwhelm the impact of the intervention;

- The biggest payoff in terms of both knowledge utilization and school improvement will be realized by emphasizing the resolution of problems that affect the core activities of the school--teaching and pupils;

- Costly planned change efforts are no more likely to have significant impacts on the school than less expensive ones. However, it is important to allocate a large proportion of the available resources to pay for staff involvement in selecting a solution and planning for implementation. It is also important to supplement external funding with internally contributed staff time and other resources; and

- While not all schools followed program specifications for a rational problem-solving process and the implementation of an R&D-based, validated "product," the program intervention had almost no significant negative impacts on schools that might offset the generally positive findings presented above.

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ANNOTATED BIBLIOGRAPHY OF REPORTS
FROM THE STUDY OF LINKING R&D WITH SCHOOLS

Chabotar, K.J. and D.G. Kell. Linking R&D with Schools: An NIE Program and Its Policy Context. September, 1978. 18 pp.

The report presents a brief overview of the R&D Utilization program, and a more detailed presentation of the policy questions that the study of the program will address. The rankings that state and federal policy makers attach to the various policy questions that form the basis for the study are discussed.

Louis, K.S., J. Molitor, G. Spencer, and R. Yin. Linking R&D with Schools: An Interim Report. September, 1979. 39 pp.

The report presents a description of the R&D Utilization program, and the seven operating demonstration projects. Characteristics of the projects that are common to all, and those that are distinctive are identified. Preliminary observations about the nature of services being delivered to schools and the impacts of these on school improvement activities are discussed. Several vignettes of school activities in the program are presented.

Kell, D. and K.S. Louis (with S. Rosenblum and J.A. Molitor). The Role of Local Action Teams in School Improvement. June, 1980. 43 pp.

The report focuses on a major objective of the RDU program: to increase participatory decision making in schools. The aim of the report is to provide teachers and administrators with guidelines for establishing effective problem-solving teams. The conclusions of the report are illustrated by the experiences of three very different schools that were involved with the program.

Louis, K.S. "Linking R&D with Schools: Products and Processes: Some Preliminary Findings from the R&D Utilization Program and Their Implications for Federal Dissemination Policies." Paper presented at the 1980 meetings of the American Educational Research Association. 26 pp.

> The paper presents a preliminary analysis of the survey data from 90 intensively studied schools. The paper concludes, on the basis of regression analyses, that all components of the planned RDU intervention strategy--the use of high quality "products," the application of technical assistance from external field agents and trainers, and the guidance of the school through a rational, participatory problem-solving process--have a strong impact upon knowledge utilization processes and outcomes. In addition, the report concludes that the effects of the variables measuring RDU strategies outweigh characteristics of the school such as readiness to engage in a change program.

Louis, K.S. "Linking R&D with Schools: Implications for School Administrators from the Study of the R&D Utilization Program." Paper prepared for the 1980 Summer Instructional Leadership Conference of the AASA. 11 pp.

> Based on data from preliminary analyses of the impact of the RDU program at the school level, several recommendations for how school administrators may facilitate the problem-solving process in schools are drawn. These include the need to emphasize using externally developed products where they are available and appropriate, attempting to maximize a change effort by encouraging the adoption of complex new practices, and the importance of administrative support in the continuation and incorporation phase. Other recommendations include the importance of promoting teacher-driven, participatory change teams, and searching for external facilitators who can provide assistance and stimulation to a locally driven process.

Spencer, G.J. and K.S. Louis (with S. Rosenblum and G. Takata). Special Report on the Training and Support of Educational Linking Agents. September, 1980. 83 pp.

> The objective of the report is to describe and assess the types of training and support that were provided to field agent personnel in the RDU program. This investigation is based on data provided by the RDU projects on the content, timing and methods of training activities for field agent personnel, and surveys of 49 field agents who were employed by the program for two or more years. In addition, "support," or informal communication, supervision and technical assistance to field agents are also analyzed, using the same data sources, and supplemented by interviews

with field agents' direct supervisors. The report concludes that (1) there were only minor differences in the formal training opportunities that each project provided to field agents; (2) field agents generally would have preferred more variety in content and training model; (3) both projects and and agent "host" organizations are important sources of support for agents; and (4) support activities have more impact on linker self-reported behavior than training.

Yin, R.K., M. Gwaltney, and K.S. Louis (with S. Rosenblum). Quality Control and Product Information Systems: An Interim Report on Implementation, Use and Effects in the R&D Utilization Program. October, 1980. 60 pp.

The report presents an analysis of the processes of developing and operating "knowledge bases" or pools of curriculum and inservice materials that were used by the seven RDU projects in providing services to their client schools. The major issues addressed include those of locating, acquiring and certifying materials, and the problems of matching locally defined school needs with the information that was available. The analysis indicates that despite considerable efforts on the part of NIE and the seven projects to emphasize the dissemination of validated R&D-based products, as many as 60% of the products adopted by the schools did not meet the criteria established in the program design. Some reasons for the discrepancies between intent and implementation are discussed.

Corwin, R.G. Program Design and Implementation: Biography of a Federal Program in its Funding Agency. November 3, 1980. 90 pp.

This reports analyzes the role of NIE as an agency in stimulating and supporting the development of the RDU program. The report emphasizes the interaction between the structure of the agency and the evolving events as they shaped major program decisions.

Chabotar, K.J., K.S. Louis, and S. Rosenblum, "The RDU Study and Its Policy Context: Perspectives of Educational Policy Makers." December 1, 1980. 26 pp.

This memorandum to NIE summarizes some of the preliminary findings from the RDU program, and the reactions to them of 14 major educational policy makers in the National Institute of Education and the Office of Education.

Louis, K.S., S. Rosenblum, and D. Kell. "Staff Development and Curriculum Change: What's Good for Teachers is Good for Schools." February, 1981. 9 pp.

This brief report is intended to communicate to teachers the findings of the study regarding the staff development benefits that occurred as a result of participating in the RDU process. The report concludes that teachers who participated on a team benefitted more than those who did not, that providing expert training in implementing a new curriculum produced more staff development benefits, and that focus on practical classroom problems was beneficial for teachers. The report concludes that merging inservice/staff development programs and planned change programs will create a more complimentary use of limited school funds.

Louis, K.S. "Policy Researcher as Sleuth: Integrating Qualitative and Quantitative Data." Paper presented at the 1981 meetings of the American Educational Research Association. 25 pp.

This paper presents an overview of the methodology of the study of the R&D Utilization program, and discusses the use of a "consolidated coding" approach to merging data collected by survey with that collected through semi-structured site visits. Some of the issues and problems associated with the methods are presented.

Chabotar, K.J., K.S. Louis and J. Sjogren. "Relationships Between Local Contributions and the Success of a Federal School Improvement Program." May, 1981. 6 pp.

This report presents very briefly the results of one component of a study of the costs of participating in RDU. The findings indicate that the total cost of the change effort (federally contributed plus locally contributed costs) is not related to the level of success of the change effort. The percentage of costs that represented locally contributed time and dollars was, however, positively correlated with success.

Louis, K.S. and D. Kell (with A. Young, G. Spencer, R. Carlson and B. Taylor) The Human Factor in Dissemination: Field Agent Roles in their Organizational Context. July, 1981. 190 pp.

This report presents an exploratory analysis of the field agent role based on surveys and interview materials from field agents in the RDU program. The report focuses on the role dilemmas of field agents, which include role conflict, role ambiguity, margin-

ality, and unclear specifications for behavior. Factors that affect both field agent job satisfaction and job performance, as measured by client satisfaction and agent assessments of school outcomes, are discussed. Three case studies that illuminate some of the problems of managing field agents, of developing appropriate role definitions with clients, and of choosing day-to-day tactics of role enactment are presented to enhance the quantitative survey findings. A preliminary model to explain agent job-related attitudes and role performance is derived from the analysis.

Louis, K.S., D. Kell, K. Chabotar, and S.D. Sieber (with P. Desmond) (eds.). Perspectives on School Improvement: A Casebook for Curriculum Change. July, 1981. 240 pp.

This report presents a framework within which administrators and curriculum coordinators can interpret various problems in managing change. Chapter-length case studies of schools that participated in the RDU program are presented to illuminate change management issues in three areas: leadership and participation; strategies and tactics of initiating and implementing new programs; and managing contingencies that arise in the change process. Each chapter is accompanied by questions that are suitable for group discussion of the case, and a chapter synthesizing across all 12 cases is presented. The report is intended for use either as a text or as a book of readings for school professionals.

Louis, K.S. and S. Rosenblum (with G. Spencer, J. Stookey and R. Yin). Designing and Managing Interorganizational Networks. July, 1981. 180 pp.

The report examines the assumptions underlying the emphasis of the RDU program on the development of interorganizational networks to support the delivery of information and technical assistance to schools. A model for examining network design, network management, and the outcomes of networking is presented and illustrated through the presentation of four chapter-length cases of RDU programs. The final chapter derives conclusions and recommendations regarding design and management of interorganizational relationships.

Louis, K.S., A. Rosenblum, and J. Molitor (with K. Chabotar, D. Kell and R. Yin). Strategies for Knowledge Use and School Improvement. July, 1981. 260 pp.

The report examines the process of change at the school level, using a framework that draws upon current organizational theory, and assumptions about knowledge utilization

and school improvement. The report draws most heavily on quantitative data sources to illuminate the relationship between the intervention strategies used by the RDU projects, and school processes and outcomes; it also uses qualitative case material to expand upon the findings. The final chapter presents some reflections drawn from observations of the participating schools about the ways in which knowledge utilization and general school improvement can be facilitated.

Louis, K.S., Rosenblum, S. and Molitor, J. Strategies for Knowledge Use and School Improvement: A Summary. July, 1981. 50 pp.

This report combines two papers presented at the American Educational Research Association meetings in 1981. The first paper presents an overview of the outcomes of the RDU program at the school level, while the second presents an analysis of the way in which product characteristics, technical assistance, the internal problem-solving process, and school and pupil characteristics predict the level of success of the program. (This report is a summary of Volume 2 of the Final Report.)

Louis, K.S. and Rosenblum, S. Linking R&D with Local Schools: A Summary of Implications for Dissemination and School Improvement Programs. July, 1981. 21 pp.

This report serves as an executive summary for the project, and synthesizes the main findings of both volumes of the final report in the context of some of the major policy and management decisions that currently face dissemination programs at the federal and state level.